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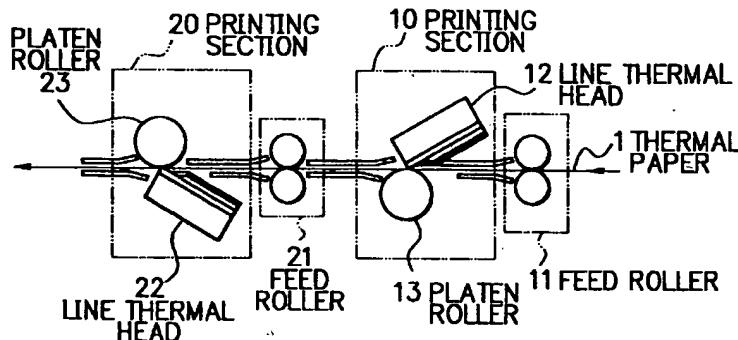
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(54) Both faces print station

(57) A both faces print station which enables size to be small and enabling printing speed to be fast is obtained. A first printing section is provided with a first line thermal head (12) and a first platen roller (13) which put a paper transferring route therebetween. A second printing section is provided with a second line thermal head (22) and a second platen roller (23) which put a

paper transferring route therebetween. The first printing section is arranged symmetrically to the second printing section with each other. The printing to the both of front and back sides of a thermal paper is performed simultaneously.

FIG. 2A



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Description**BACKGROUND OF THE INVENTION**

[0001] The present invention relates to a both faces print station. More particularly, this invention relates to a both faces print station which prints both faces of thermal paper using a line thermal head simultaneously.

Description of the Prior Art

[0002] There is described a conventional both faces print station in detail referring to drawing.

[0003] Fig. 1 is a side view showing one example of a conventional both faces print station. The both faces print station shown in Fig. 1 is constituted such that printing means 120, 130 are allocated both faces of a route of a paper P transferred by paper feeding means 110, 111 (referring to for instance, Japanese Patent Application Laid-Open HEI No. 03-51149).

[0004] The printing means 120, 130 are provided with carriers 121, 131 which perform a reciprocating motion in parallel to paper surface of the paper P. The carriers 121, 131 are provided with thermal heads 122, 131 and motors 123, 133 for the sake of self-propelled. There is installed running gears 124, 134 to the motors 123, 133.

[0005] Frames 125, 135 of the printing means 120, 130 are provided with guide shafts 126, 136 for guiding the carriers 121, 131 in parallel to paper surface of the paper P, racks 127, 137 engaged with the running gears 124, 134, and platens 128, 138.

[0006] The carriers 121, 131 are provided with a ink ribbon, and it causes the motors 123, 133 to be rotated in the forward or reverse direction so that it causes the carriers 121, 131 to be moved in reciprocating motion, thus the both faces printing is implemented by applying printing command to the thermal heads 122, 132.

[0007] The above described conventional both faces print station has the defect that printing speed is slow because mechanical component such as the frame and so forth with which the platen is loaded increases in number, thus becoming large-sized one.

SUMMARY OF THE INVENTION

[0008] In view of the foregoing, it is an object of the present invention, in order to overcome the above-mentioned problem, to provide a both faces print station whose size is small and printing speed is high.

[0009] According to a first aspect of the present invention, in order to achieve the above-mentioned object, there is provided a both faces print station which comprises a first printing section provided with a first line thermal head and a first platen roller which put a paper transferring route therebetween, and a second printing section provided with a second line thermal head and a second platen roller which put said paper transferring route therebetween; wherein the first printing section

and the second printing section are arranged symmetrically with each other, thus causing a printing to be implemented to both faces of front and back sides of a thermal paper simultaneously.

5 [0010] According to a second aspect of the present invention, in the above first aspect, there is provided a both faces print station, wherein there are provided with a gear mechanism for carrying rotation from a LF motor drive source fastened to a frame in order to transfer the thermal paper to a first and a second feed rollers and the first and the second platen rollers, a first gear fastened to the first and the second feed rollers, and a second gear fastened to the first and the second platen rollers.

10 [0011] According to a third aspect of the present invention, in the above first aspect, there is provided a both faces print mechanism, wherein in the first and the second printing sections, the first thermal head is arranged opposite to the second thermal head and the

20 first platen roller is arranged opposite to the second platen roller, and the first printing section which causes print to be implemented toward front side of the thermal paper has arrangement of the line thermal head and the platen roller at one side, and the second printing section

25 which causes print to be implemented toward back side of the thermal paper has arrangement of the line thermal head and the platen roller at the other side, in which the line thermal head and the platen roller of the first printing section is arranged symmetrically to the line thermal head and the platen roller of the second printing section with each other.

30 [0012] According to a fourth aspect of the present invention, in the above first aspect, there is provided a both faces print station, wherein there are provided with a first and a second sensors for detecting the thermal paper on this side of the first and the second platen rollers to transfer the thermal paper toward a position capable of being printed.

35 [0013] According to a fifth aspect of the present invention, there is provided a printing method of the both faces print station comprising the steps of transferring a thermal paper by a first feed roller, detecting a top of the thermal paper by a first sensor, sending the thermal paper to a position where printing is capable of being performed between a first line thermal head and a first platen roller, and causing printing to be performed to a front side of the thermal paper due to a print command for the first line thermal head.

40 [0014] According to a sixth aspect of the present invention, there is provided a printing method of the both faces print station comprising the steps of, being sent a thermal paper from a first printing section only some distance therefrom, detecting a top of the thermal paper by a second sensor, sending the thermal paper to a position where printing is capable of being performed between a second line thermal head arranged symmetrically to the first line thermal head and a second platen roller, and causing printing to be performed to a back

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side of the thermal paper due to a print command for the second line thermal head.

[0015] According to a seventh aspect of the present invention, in the first aspect, there is provided a both faces print station, wherein it causes printing to be performed to both faces of front and back sides of the thermal paper due to transferring of one way direction of the thermal paper.

[0016] According to an eighth aspect of the present invention, in the fist aspect, there is provided a both faces print station, wherein there are provided with a first and a second ink ribbons passing through between the first and the second line thermal heads and between the first and the second platen rollers, a means for feeding the first and the second ink ribbons in respective directions synchronized with transferring speed of a paper, and a means for performing thermal printing of an ink applied to print face side of the first and the second ink ribbons toward both faces of the paper.

[0017] The above and further objects and novel features of the invention will be more fully understood from the following detailed description when the same is read in connection with the accompanying drawings. It should be expressly understood, however, that the drawings are for purpose of illustration only and are not intended as a definition of the limits of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is a side view showing one example of a both faces print station;

Figs. 2A to 2C are side views and plan view showing a both faces print station according to one embodiment of the present invention;

Fig. 3 is a side view showing details of Fig. 2A; and Fig. 4 is a side view showing a both faces print station according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] A preferred embodiment of the present invention will be described in detail in accordance with the accompanying drawings. Figs. 2A to 2C are side views and plan view showing one embodiment of the present invention. Fig. 3 is a side view showing printing section shown in Fig. 2A.

[0020] In the both faces print station shown in Figs. 2A to 2C, there are provided with a first printing section 10 and a second printing section 20 symmetrically with each other. The first printing section 10 comprises a first line thermal head 12, and a first platen roller 13, which put a paper transferring route therebetween. The second printing section 20 comprises a second line thermal head 22 and a second platen roller 23, which put a

paper transferring route therebetween. The both faces print station prints both faces of front and back sides of a thermal paper 1 simultaneously.

[0021] The both faces print station of the present invention is provided with gear (11) 6, gear (12) 7 for carrying rotation toward feed rollers 11, 21 and platen rollers 13, 23 from drive source of fastened LF motor 3 to a frame 2, a gear (F) 5 fastened to the feed rollers 11, 21, and a gear (P) 4 fastened to the plate rollers 13, 23 in order to transfer the thermal paper 1.

[0022] In the printing section 10, the line thermal head 12 is arranged opposite to the platen roller 13. In the printing section 20, the line thermal head 22 is arranged opposite to the platen roller 23. An arrangement of the line thermal head 12 and the platen roller 13 of the printing section 10 in order to print to front side of the thermal paper 1 is arranged symmetrically to an arrangement of the line thermal head 22 and the platen roller 23 of the printing section 20 in order to print to reverse side of the thermal paper 1 with each other.

[0023] There are provided sensors 14, 24 in front of the platen rollers 13, 23 in order to detect the thermal paper 1 and to tranfer the thermal paper 1 to the position where printing is capable of being performed.

[0024] Next, there will be described operation. The LF motor 3 rotates in constant direction in accordance with drive command of a paper carrying system. Rotation is carried to the feed rollers 11, 21 and the platen rollers 13, 23 while linking respective gears depending on drive of the LF motor 3.

[0025] The thermal paper 1 transferred by drive of the LF motor 3 is sent to the printing sections 10, 20 capable of being printed, by the feed roller 11, 21, thus being printed at both faces of front and back sides of the thermal paper 1.

[0026] The thermal paper 1 is transferred by the feed roller 11. A sensor 14 detects the top of the thermal paper 1. The thermal paper 1 is sent to a position between the line thermal head 12 and the platen roller 13, where printing is capable of being performed. Thus the printing to the front side of the thermal paper 1 is implemented in accordance with the printing command toward the line thermal head 12.

[0027] Next, when the thermal paper 1 is sent some distances from the printing section 10, a sensor 24 detects the top of the thermal paper 1. The thermal paper 1 is sent to a position between the line thermal head 22 and the platen roller 23 arranged symmetrically to the line thermal head 12, where a printing is capable of being performed. Thus the printing to the back side of the thermal paper 1 is implemented in accordance with the printing command toward the line thermal head 22.

[0028] The both faces print station of the present invention is capable of printing to the both faces of front side and back sides of the thermal paper simultaneously, due to the one way transferring of the thermal paper.

[0029] Fig. 4 is a side view showing a second embod-

iment of the present invention. A both faces print station shown in Fig. 4 comprises ink ribbons 9-a, 9-b passing through between the line thermal heads 12, and 22, and between the platen rollers 13, and 23, a means for feeding the ink ribbon 9-a, 9-b in the arrow direction synchronized with transferring speed of the paper 8, and a means for performing thermal printing of an ink applied to printing face side of the ink ribbon 9-a, 9-b toward both faces of the paper 8 simultaneously.

[0030] The printing section of the second embodiment is constituted by only parts which are opposite to the line thermal head and the platen roller so that the printing section can be miniaturized, and since the line thermal head is in use, the printing speed is improved.

[0031] As described above, the both faces print station according to the present invention, since the paper is traveled only one way direction between a pair of the line thermal heads which are arranged oppositely, there is the effect that the both faces print station is small size and whose printing speed is fast.

[0032] While preferred embodiments of the invention have been described using specific terms, such description is for illustrative purpose only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

Claims

1. A both faces print station comprising:

a first printing section provided with a first line thermal head and a first platen roller which put a paper transferring route therebetween; and a second printing section provided with a second line thermal head and a second platen roller which put said paper transferring route therebetween,
wherein said first printing section and said second printing section are arranged symmetrically with each other, thus causing a printing to be implemented to both faces of front and back sides of a thermal paper simultaneously.

2. A both faces print station as claimed in claim 1, wherein there are provided with a gear mechanism for carrying rotation from a LF motor drive source fastened to a frame in order to transfer said thermal paper to a first and a second feed rollers and said first and said second platen rollers, a first gear fastened to said first and said second feed rollers, and a second gear fastened to said first and said second platen rollers.

3. A both faces print mechanism as claimed in claim 1, wherein in said first and said second printing sections, said first thermal head is arranged opposite to said second thermal head and said first platen roller

is arranged opposite to said second platen roller, and said first printing section which causes print to be implemented toward front side of said thermal paper has arrangement of the line thermal head and the platen roller at one side, and said second printing section which causes print to be implemented toward back side of said thermal paper has arrangement of the line thermal head and the platen roller at the other side, in which the line thermal head and the platen roller of the first printing section is arranged symmetrically to the line thermal head and the platen roller of the second printing section with each other.

15 4. A both faces print station as claimed in claim 1, wherein there are provided with a first and a second sensors for detecting said thermal paper on this side of said first and said second platen rollers to transfer the thermal paper toward a position capable of being printed.

20 5. A printing method of the both faces print station comprising the steps of:

25 transferring a thermal paper by a first feed roller;
detecting a top of said thermal paper by a first sensor;
sending said thermal paper to a position where printing is capable of being performed between a first line thermal head and a first platen roller; and
causing printing to be performed to a front side of said thermal paper due to a print command for said first line thermal head.

35 6. A printing method of the both faces print station comprising the steps of:

40 being sent a thermal paper from a first printing section only some distance therefrom;
detecting a top of said thermal paper by a second sensor;
sending said thermal paper to a position where printing is capable of being performed between a second line thermal head arranged symmetrically to said first line thermal head and a second platen roller; and
causing printing to be performed to a back side of said thermal paper due to a print command for said second line thermal head.

45 7. A both faces print station as claimed in claim 1, wherein it causes printing to be performed to both faces of front and back sides of said thermal paper due to transferring of one way direction of said thermal paper.

8. A both faces print station as claimed in claim 1,
wherein there are provided with a first and a second
ink ribbons passing through between said first and
said second line thermal heads and between said
first and said second platen rollers, a means for
feeding said first and said second ink ribbons in
respective directions synchronized with transferring
speed of a paper, and a means for performing ther-
mal printing of an ink applied to print face side of
said first and said second ink ribbons toward both
faces of the paper.

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F I G. 1
PRIOR ART

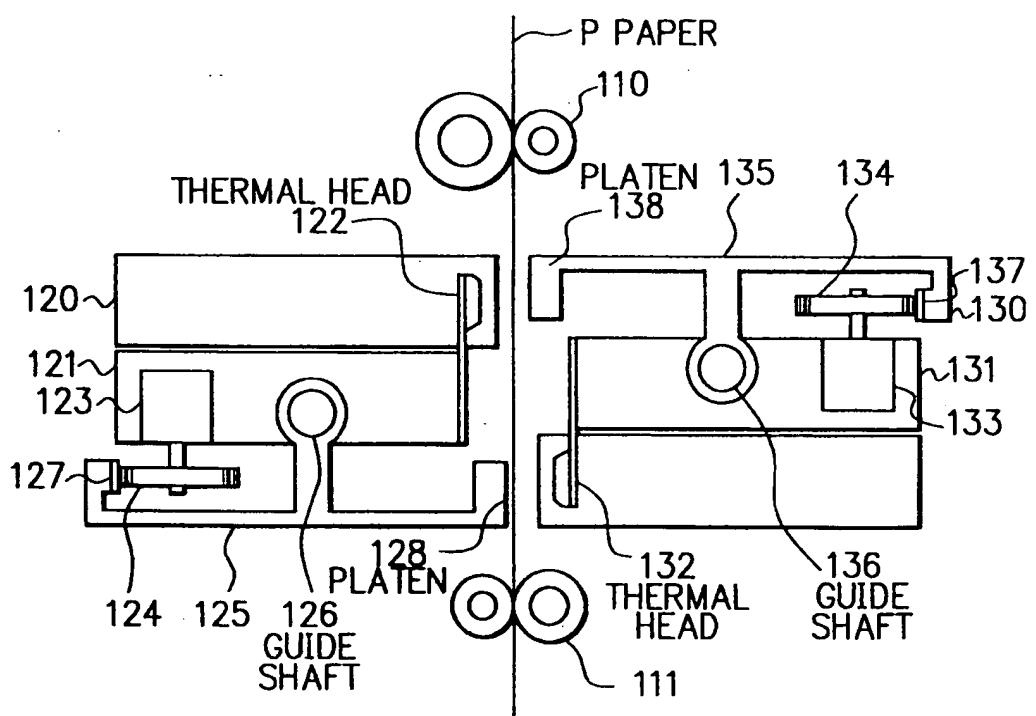


FIG. 2A

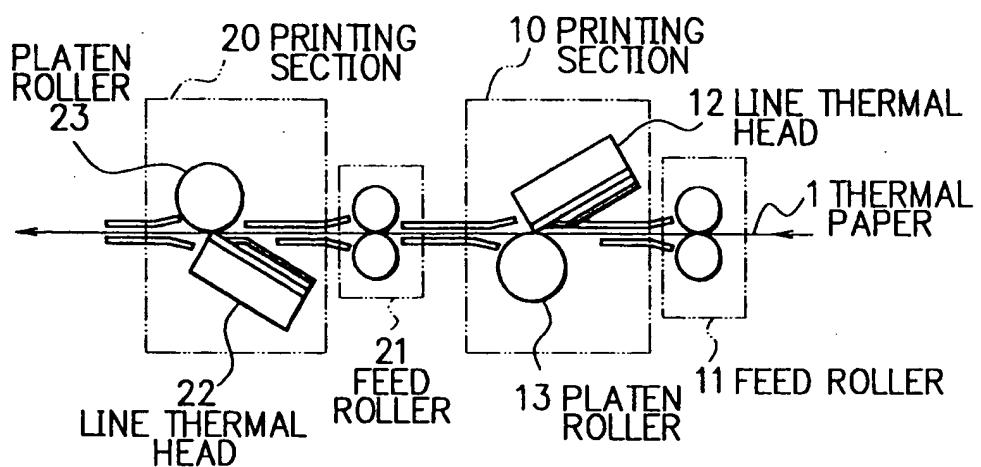


FIG. 2B

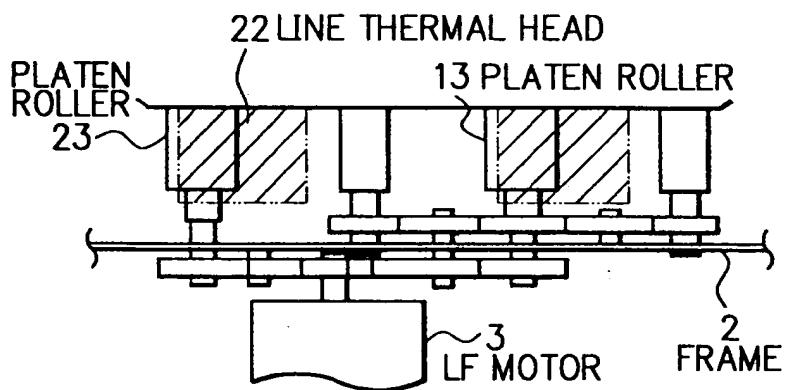
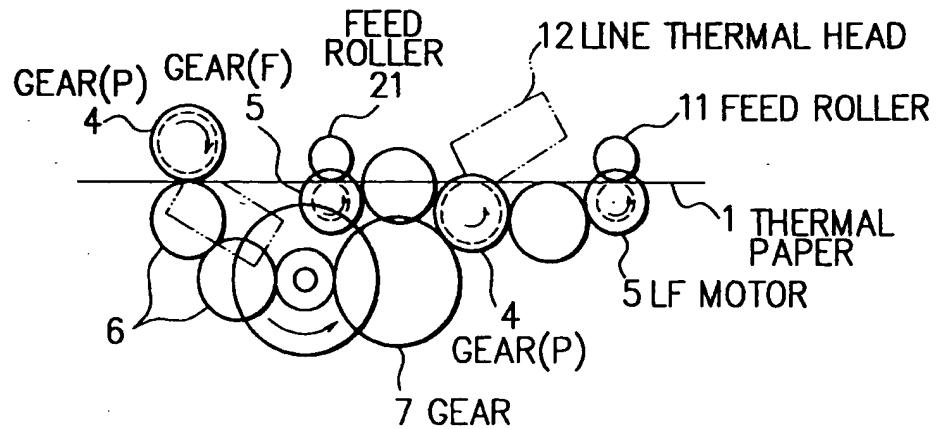
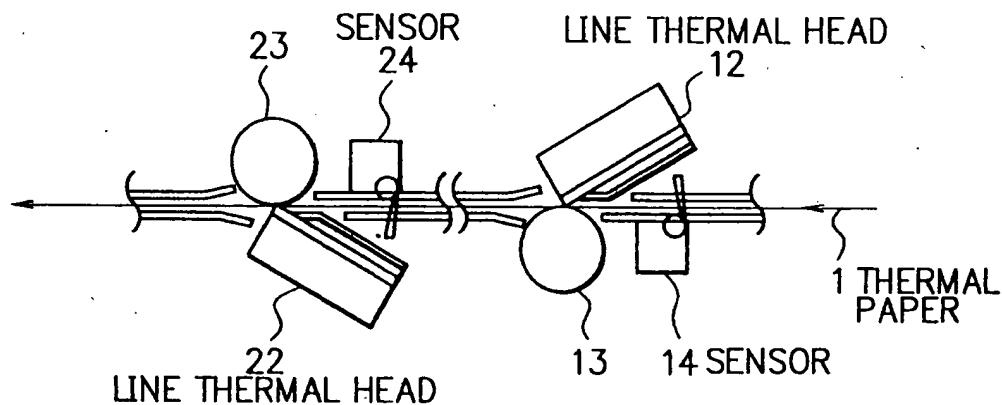


FIG. 2C



F I G. 3



F I G. 4

